

8-31-07

EPW



Appn Number 10/738,335(Tarnopolsky etal)

Amnt 1 of 9

## In the United States Patent and Trademark Office

Serial Number: 10/738,335

Appn Filed : 12/18/2003

Applicants : Mikhail Tarnopolsky

Galina Tarnopolsky

Title: System and Method of getting for a bicycle and other pedal-driven  
vehicles, mechanical energy output exceeding muscular energy input,  
due to the gravitational Lever

Art Unit: 3682

Examiner: Charles, Marcus /74560

### Substitute Specification

(in clean form)

Commissioner for Patents

P.O. Box 1450

Alexandria, Virginia 2213-1450

Dear Sir:

This is a response to the office communication concerning this application dated  
06/14/2007 and 07/19/2007

Claims are rejected by you under 35 U.S.C.112, second paragraph as being  
indefinite to failing to particularly point out and distinctly claim the subject matter which  
we are regarding as the invention.

The claims are narrative in form and replete with indefinite and functional or  
operational language.

The structure, which goes to make up the device, must be clearly, positively  
specified and organized and correlated in such a manner as to present a complete  
operative device.

Under 35 U.S.C 112 the specification shall conclude with one or more claims  
particularly pointing out and distinctly claiming the subject matter which the applicants  
regard as their invention.

The specification is objected to by you because the disclosure is unclear, punctuated by numerous individual amendments and because of that is difficult to consider the entire specification including claims.

Under 37 CFR 1.125 section(a) in these cases the entire specification including claim should be rewritten.

A substitute specification submitted under this section shall be submitted with markings showing all the changes relative to amendment mailed March 13th, 2007 and office communication mailed 06/14/2007. A clean substitute specification is attached.

A planetary transmission for a bicycle and method of obtaining higher riding speed.

## Background

A planetary transmission for a bicycle and a method of obtaining higher riding speed are based on the experimental data of conversion of gravity into mechanical rotational energy (approved by USA patents 5,667,038; 5,921,133A; 6,363,804 B1; 6,601,478 B2) and experimental data of riding new type of bicycle having planetary transmission(approved by working model since 1999 and two prototypes since 2002)

The main difference between the regular and the new type of bicycles is in their pedals' system.

A regular bicycle has a balanced pedals' system with two similar pedals freely rotated around their axes under the foot's muscular energy.

The new type of bicycle has an unbalanced pedals' system with two different pedals. One pedal is a regular one and freely rotates around its axle under the foot's muscular energy.

The other is different in terms that it rotates around its axle not only under the foot's muscular energy, but also under the earth gravity in the positive zone of rotation and under the inertial energy supported by foot's muscular energy in the negative zone of rotation.

The gravitational pedal carries out two functions:

-to transmit the driving power from the foot's muscular energy to a drive wheel of a bicycle

-to transmit the driving power from the foot's muscular energy together with gravitational energy for its recirculation by means of inertial energy, appearing in a negative zone of rotation!

It can be proven by various tests, and gravitational pedal makes it much easier (spending less energy) to ride a bicycle.

The gravitational pedal together with the planetary transmission (Fig 1, Fig 2A. Parts # 4s; 5; 5A) makes it possible to ride with higher speed of about 35 MPH (average bicyclists speed is of 15-17 MPH) spending the same muscular energy.

This idea can be a first step towards the production of a faster and more efficient engine systems.

## Summary of the invention

The object of the present intention is providing a new planetary transmission for a bicycle and a method of obtaining higher riding speed.

In keeping with these objectives (and with others which will become apparent hereinafter) one feature of the present invention resides, briefly stated, in a planetary transmission for a bicycle and in a method of obtaining higher riding speed, which has a first rotatable unbalanced element as a receiver of the power from the foot's muscular energy and gravitational energy, converting both of them (muscular and gravitational) into mechanical energy for transmitting the driving power via the second, one-way directional rotatable element, and the third opposing rotatable element, to a driving sprocket of a bicycle, which is attached to the third element, and freely rotates with the third element on a crank's axle for transmitting the driving power via a chain to a freewheel and then to a drive wheel of a bicycle, where the bicycle is in a course of forward motion from the pedals, and a first rotatable element, being connected to the crank by means of a leading axle, rotates clockwise together with the crank's axle under the foot's muscular energy and the earth gravity into a positive zone of rotation, and under the inertial energy appearing in this negative zone of rotation together with the muscular energy, and at the same time a first element rotates counter-clockwise around it's own axis of rotation together with the leading axle, powered by the foot muscles and the displaced unbalanced mass, while the second rotatable element, being connected to the first rotatable element by means of the overrunning clutch, and also connected to the

third element by means of tothing, rotates clockwise around the third element and around the crank's axes of rotation, and powered the same way as the first element, and at the same time, the second element rotates counter-clockwise around its own axle of rotation, powered the same way as the first element on its counter-clockwise rotation, and, consequently, makes the third element with the driving sprocket on it, rotate faster than the usual system(meaning the system without this transmission) using the same muscular energy.

The method of this invention is based on the interaction between two groups of parts of the transmission, one of which is placed on the crank's axle for a free rotation around it, while the other part is placed on the crank's axle for rotation with it.

The invention itself, however, both as to its structure and as to its manner of operation, will be best understood from the following description of a preferred embodiment, which is accompanied by the following drawings.

### Brief Description of the drawings

Fig.1 is a vertical sectional view of the schematic representation of a planetary transmission for a bicycle.

Fig.2A is a rear view according to the arrow "A", shown in Fig.1.

Fig.2B is a side view according to the arrow "B", shown in Fig.1.

### Detailed description-Figs 1, 2A and 2B preferred embodiment

A preferred embodiment of a planetary transmission of the present invention is illustrated in Fig1 (vertical sectional view),Fig 2A(rear view) and Fig 2B (side view).

A planetary transmission for a bicycle consisting of a crank 8 and crank's axle (not numbered) as a base for the interaction between two groups of transmission parts, one of which is placed on a crank's axle for rotation around the axle, while the other group of transmission parts is placed on a crank's axle for rotation with the axle. The first group of transmission parts includes sun disk 5 of a planetary mechanism. The second group of transmission parts includes the crank 8. The interaction between two groups of transmission parts will be best understood from the following comparison of a new planetary transmission with the usual transmission for a regular bicycle.

A regular bicycle with the usual transmission has a balanced pedals' system with two similar pedals, which are alternately powered by foot muscles and freely rotates around their axes.

A driving sprocket of a regular bicycle is attached to a crank's axle and rotates with the axle as well as the pedals with the same speed. One turn of the pedals provides one turn of the driving sprocket.

A new type of a bicycle with a planetary transmission has an unbalanced pedals' system with two different pedals. One pedal is a regular one and freely rotates around its axle powered by foot muscles. The other pedal is different in terms that it rotates not only around its axle, but together with a leading axle 2 and powered not only by foot muscles but also by earth gravity (in positive zone of rotation) and by inertia, which is supported by foot muscles by means of a strap 7 (in a negative zone of rotation) Because of that this pedal named "gravitational" with given number 1.

The gravitational pedal 1 with an attached unbalanced mass 1a is not symmetrical relative to the axle of rotation 2 (see all drawings). A displacement, which is taken place, provides a possibility for keeping counter-clockwise rotation of the gravitational pedal 1 around its axle together with a leading axle 2, spending the same muscular energy as usual. It is proven by various tests. It is also proven by tests, that after reaching a certain speed of rotation of the gravitational pedal (around 3 MPH) it makes much easier (spending less energy) to ride a bicycle. Gravitational pedal 1 connecting to the crank 8 from the side shown by arrow B (Fig.1) by means of a leading axle 2 and a threaded fastening. From the side shown by arrow A (Fig.1) axle 2 connecting with a satellite sprocket 4s as toothing part of an overrunning clutch 3. Such combination, which is known as a standard freewheel, uses in the present invention for a kinematical interaction between gravitational pedal 1 and sun disk 5 by means of a chainomatic periphery 5a (meaning the chain fastening to a sun disk 5) (Fig.1, Fig 2A)

The external toothing in this case is dangerous for a bicyclist and cannot be used. Driving sprocket 6 is attached to a sun disk 5 and always rotates together with a sun disk 5.

The kinematic relation between the pedal 1, satellite sprocket 4s and driving sprocket 6 is as follows: one clockwise turn of the pedal 1 together with a crank 8 around the crank's axle is making by means of an overrunning clutch 3 one clockwise turn of the

sun disk 5 together with a driving sprocket 6. At the same time pedal 1 by means of the same overrunning clutch 3 is making one counter-clockwise turn around it's own axle together with the leading axle 2 and satellite sprocket 4s, which is making an additional clockwise turn of a sun disk 5 together with a driving sprocket 6 by means of a chainomatic periphery 5a.

So that, one turn of a gravitational pedal 1 is making more than one turn of a driving sprocket 6, using the same muscular energy. An additional turn of a driving sprocket 6 depends of the chosen kinematic relations between the satellite sprocket 4s and chainomatic periphery 5a of a sun disk5.

In the prototype of the present invention the sun disk 5 with the driving sprocket 4s thereon outstrips the pedal 1 with a crank 8 by a distance equivalent to the radius of a sundisk 5 with its chainomatic periphery 5a, because in this prototype the length of the circle of the satellite 4s is equal to the radius of a sun disk 5 with the chainomatic periphery 5a thereon.

The application is not limited to the shown details, since various modifications and changes or possible without changing the invention.

What is desired to be protected by this patent is set forth in the appended claims.